National Institute of Environmental Health Sciences

The cooling effect of green spaces as a contribution to the mitigation of urban heat: A case study in Lisbon

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Abstract:

Green areas in the urban environment can contribute to the mitigation of the Urban Heat Island. In a context of climate change, with the expected increase in temperature, dryness and intensity of heat waves, green areas assume even higher importance as they can create a cooling effect that extends to the surrounding areas. This study analyses the thermal performance of a small green space (0.24 ha) and its influence in the surrounding atmospheric environment of a densely urbanised area in Lisbon. Measurements of weather parameters (temperature, relative humidity, wind speed, solar and infrared radiation) were carried out along a selected path, starting from inside the green area to surrounding streets with different orientations and solar exposure. It was found that the garden was cooler than the surrounding areas, either in the sun or in the shade. These differences were higher in hotter days and particularly related to the mean radiant temperature (Tmrt). The highest difference found was of 6.9 degrees C in relation to air temperature and 39.2 degrees C in relation to Tmrt; in both cases this difference occurred between the shaded site inside the garden and the sunny site in an E W oriented street in the southern part of the studied area. Besides the local weather conditions, particularly the low wind speed, the sun exposure and the urban geometry are the potential factors that explain these differences. The cooling effect of green areas on the surrounding environment can be enhanced by additional measures related to the urban features of each city. (C) 2011 Elsevier Ltd. All rights reserved.

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Resource Description

Exposure :

weather or climate related pathway by which climate change affects health

Air Pollution, Meteorological Factors, Solar Radiation, Temperature

Air Pollution: Interaction with Temperature, Ozone

Temperature: Extreme Heat, Fluctuations

Geographic Feature:

resource focuses on specific type of geography

Urban

Geographic Location:

resource focuses on specific location

Non-United States

Non-United States: Europe

European Region/Country: European Country

Other European Country : Portugal

Health Co-Benefit/Co–Harm (Adaption/Mitigation):

specification of beneficial or harmful impacts to health resulting from efforts to reduce or cope with greenhouse gases

A focus of content

Health Impact:

specification of health effect or disease related to climate change exposure

General Health Impact

Intervention:

strategy to prepare for or reduce the impact of climate change on health

A focus of content

Mitigation/Adaptation:

mitigation or adaptation strategy is a focus of resource

Adaptation, Mitigation

Resource Type:

format or standard characteristic of resource

Policy/Opinion

Timescale:

time period studied

Time Scale Unspecified